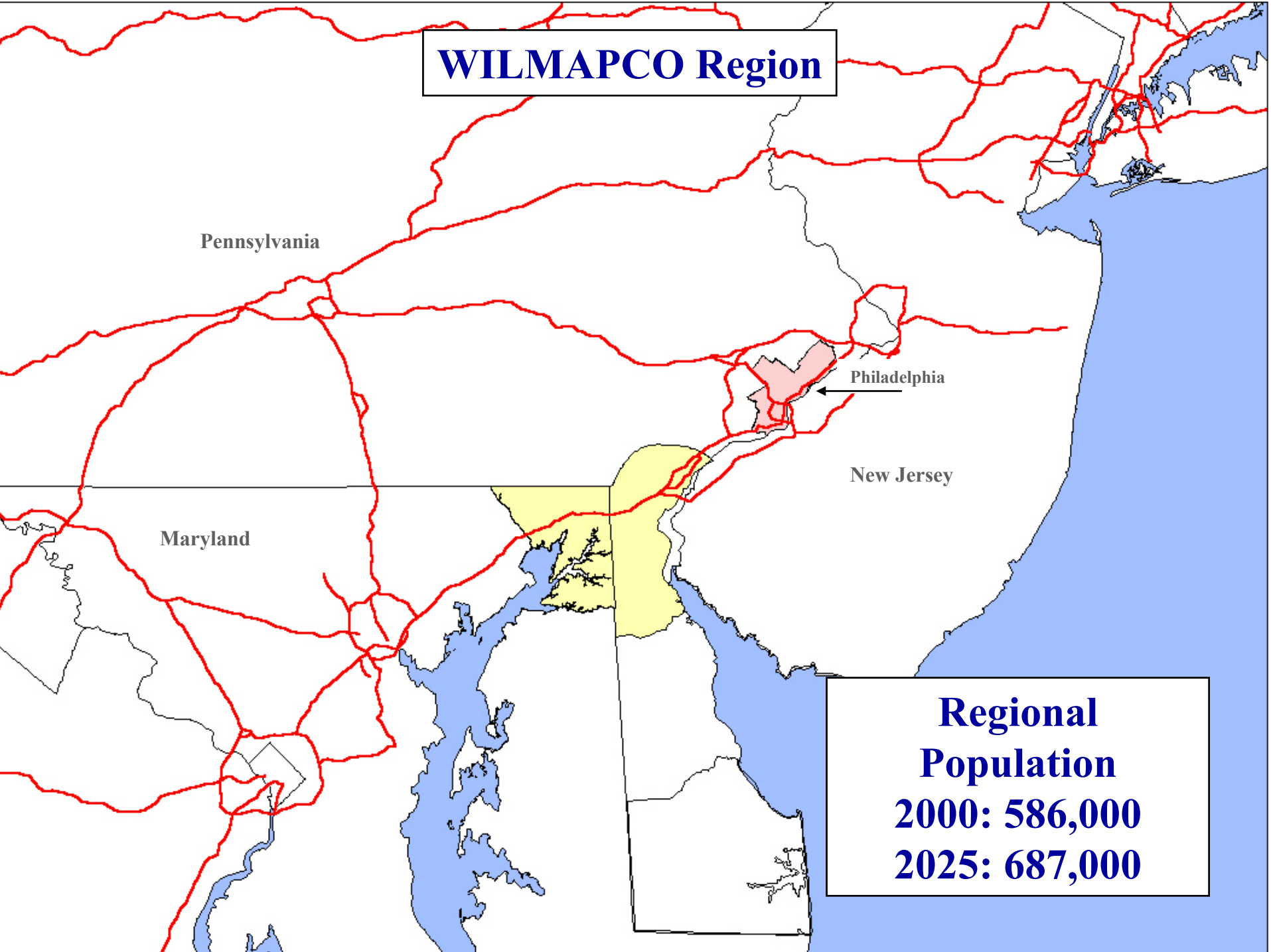
WILMAPCO

Data Uses in Congestion Management Systems

Prepared for the
NATMEC Conference
May 13th , 2002


WILMAPCO Region
Pennsylvania
Philadelphia
New Jersey
Maryland
Regional
Population
2000: 586,000
2025: 687,000

Why do we need a CMS???

- Transportation Equity Act for the 21st Century [TEA-21] states that in a Transportation Management Area (urbanized area with a population greater than 200,000) a CMS must be developed and implemented as part of the regular Metropolitan Planning Organization planning process

- WILMAPCO Population currently at 590,618 (*2001 Estimates)

- The CMS must be integrated into the metropolitan planning process and will be subject to review and certification by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) during the triennial metropolitan planning process certification review

What should the CMS do???

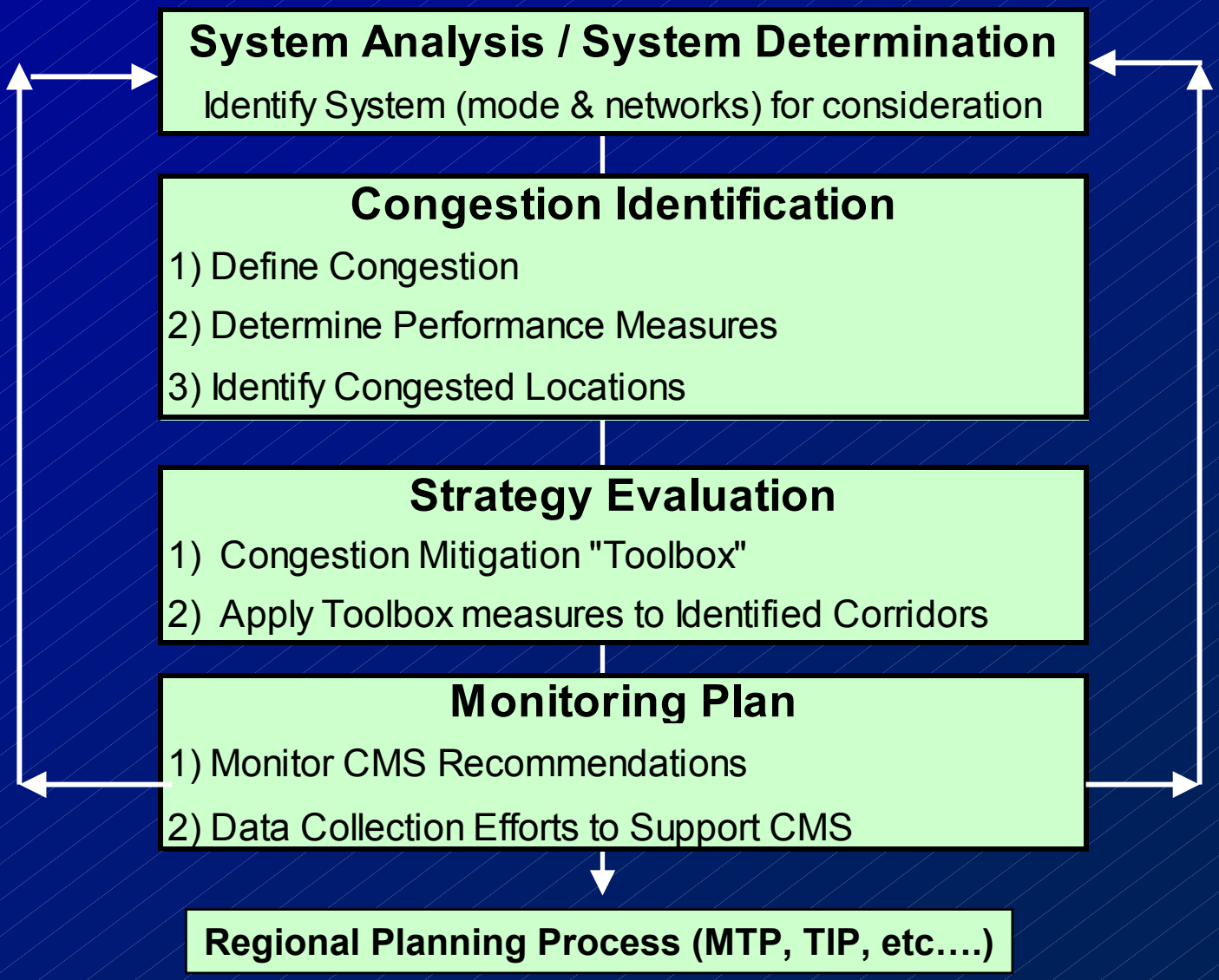
FHWA defines an effective CMS as, “a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing mobility.”

What should the CMS do???

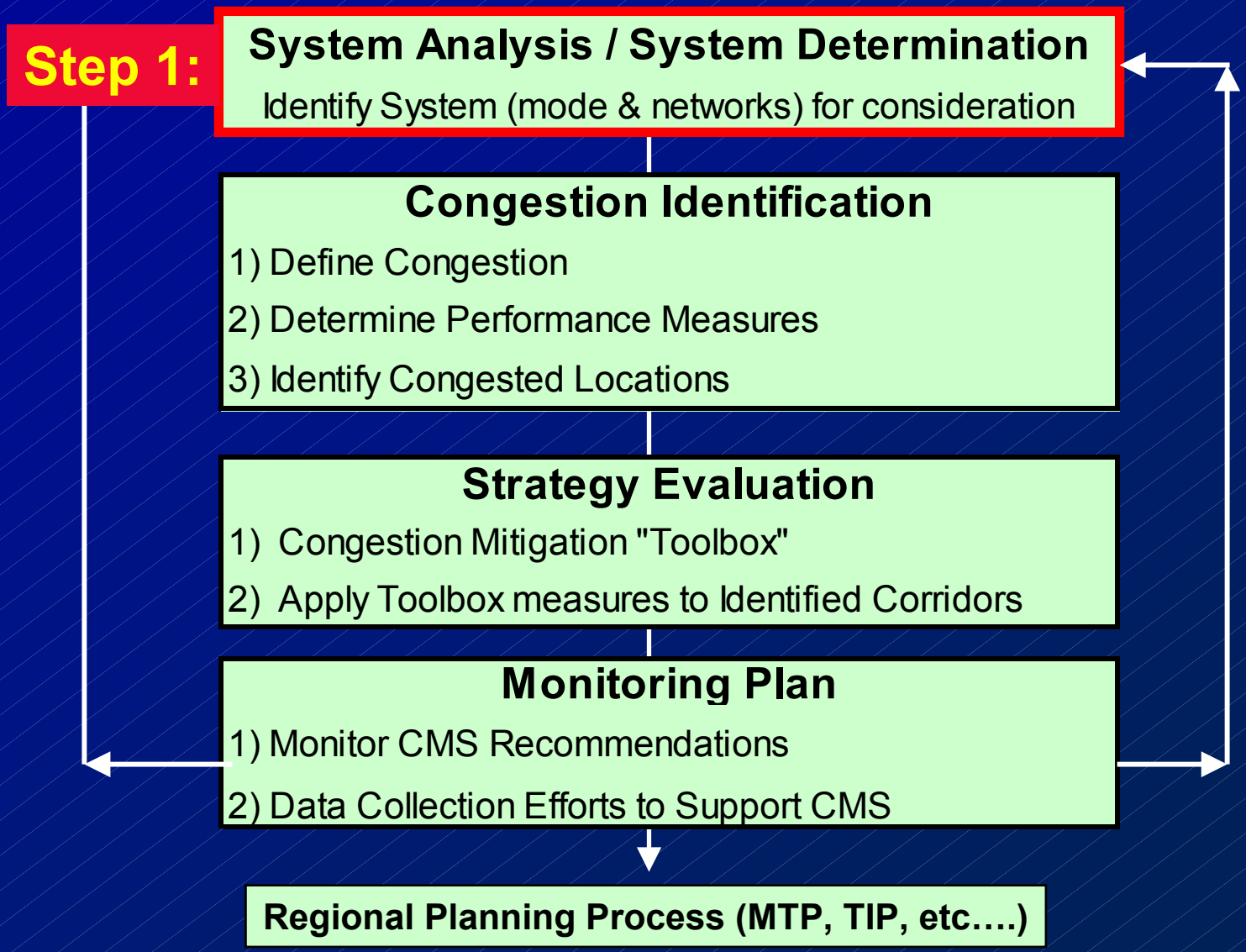
FHWA defines an effective CMS as, "a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing mobility."

- **Methods to monitor and evaluate the transportation system, identify the causes of congestion;**
- **Definition of parameters for measuring the extent of congestion;**
- **Establishment of a program for data collection and system performance monitoring;**
- **Identification and evaluation of the anticipated benefits of both traditional and non-traditional congestion management strategies;**
- **Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy; and Implementation of a process for periodic assessment of the efficiency and effectiveness of implemented strategies.**

WILMAPCO CMS Process - Overview



Step 1: Defining the System

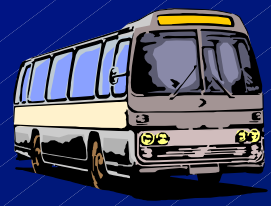


Defining Transportation Modes & Network

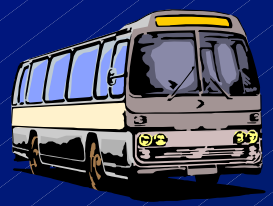
- Report is limited to *roadway* and *bus* congestion on data limitations

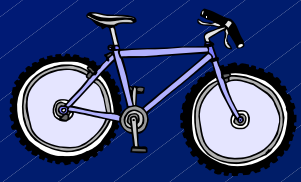
Defining Transportation Modes & Network

- Report is limited to *roadway* and *bus* congestion on data limitations

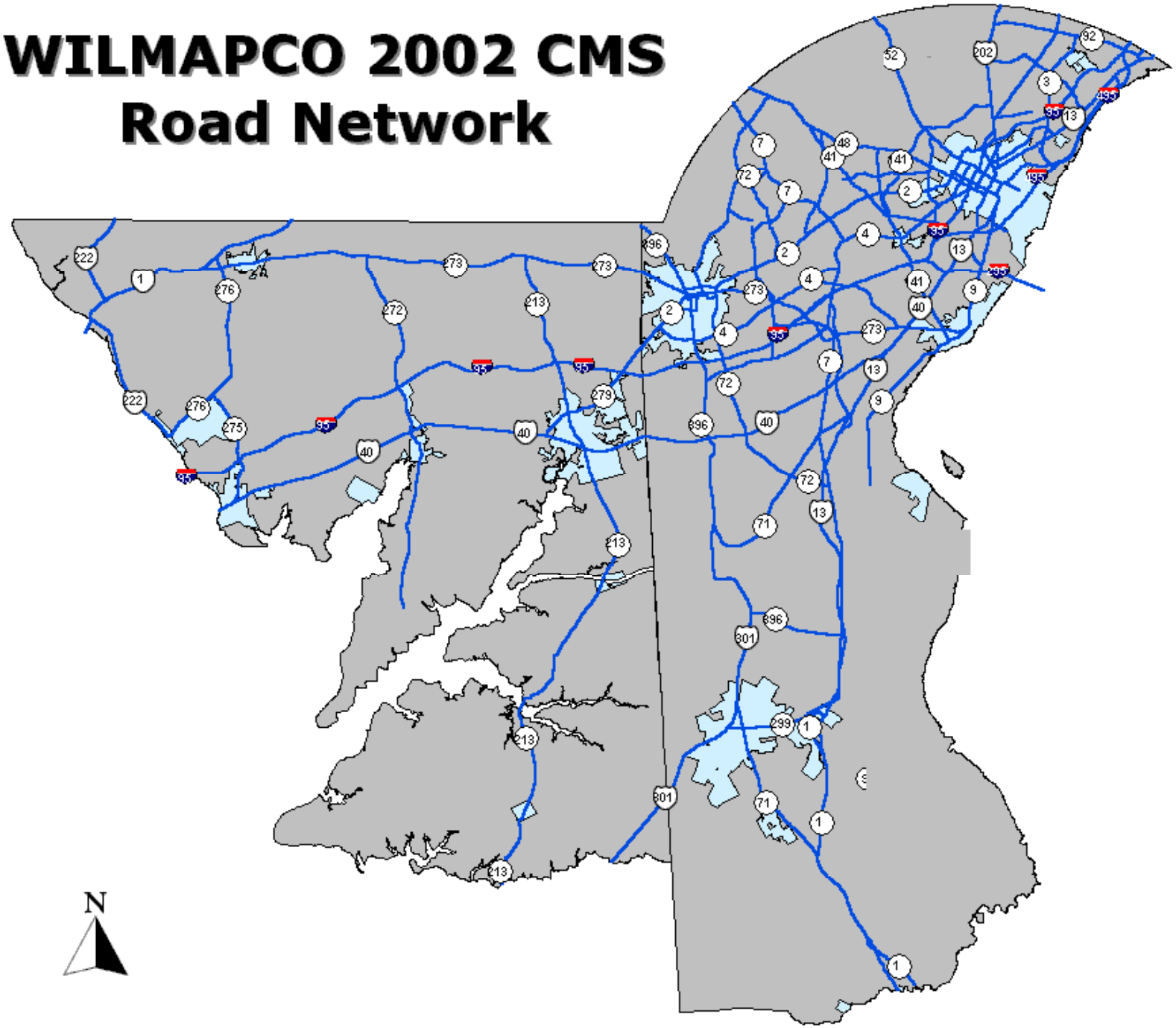


- Congestion Solutions, however, will include *all* modes

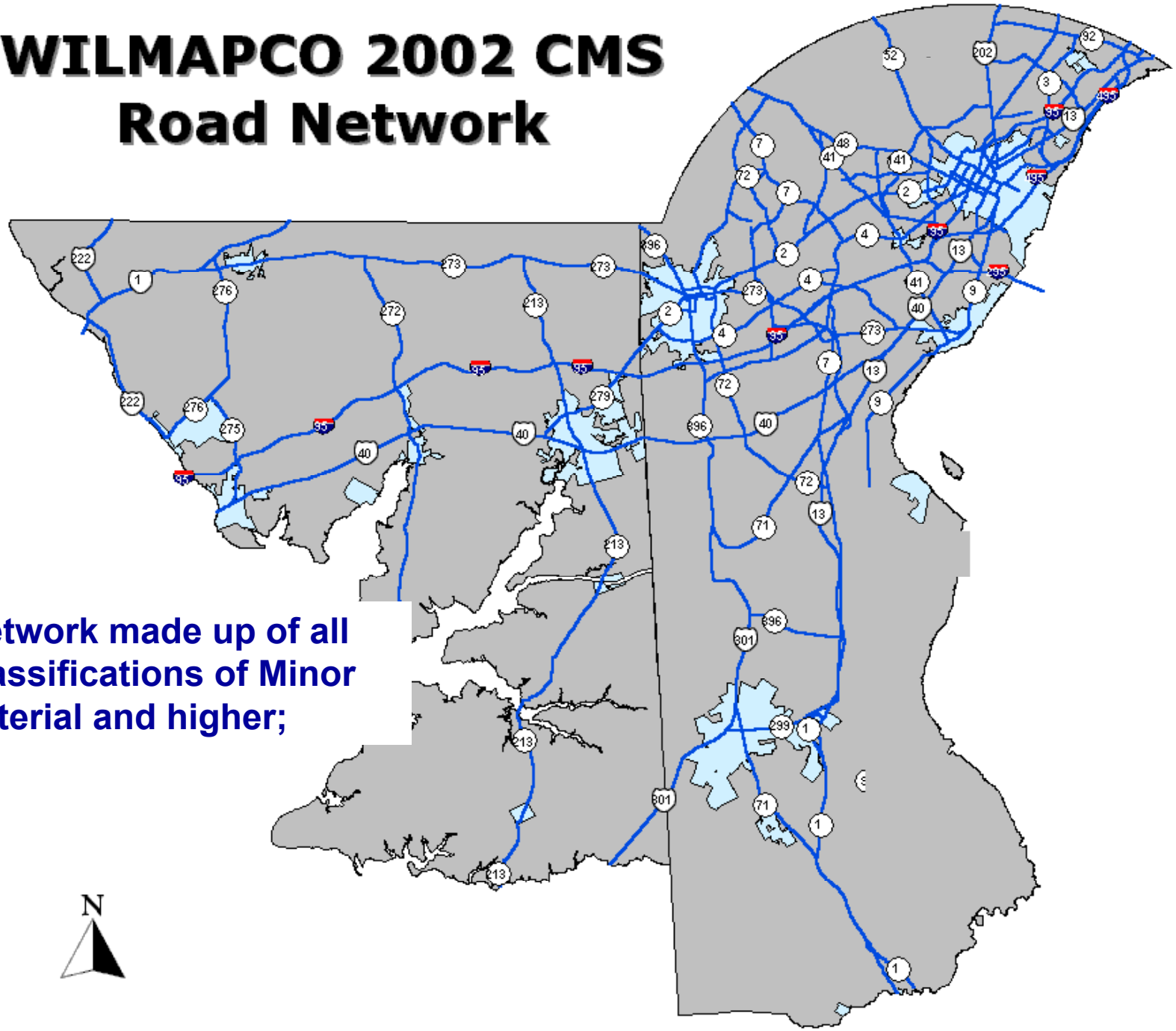




WILMAPCO 2002 CMS
Road Network

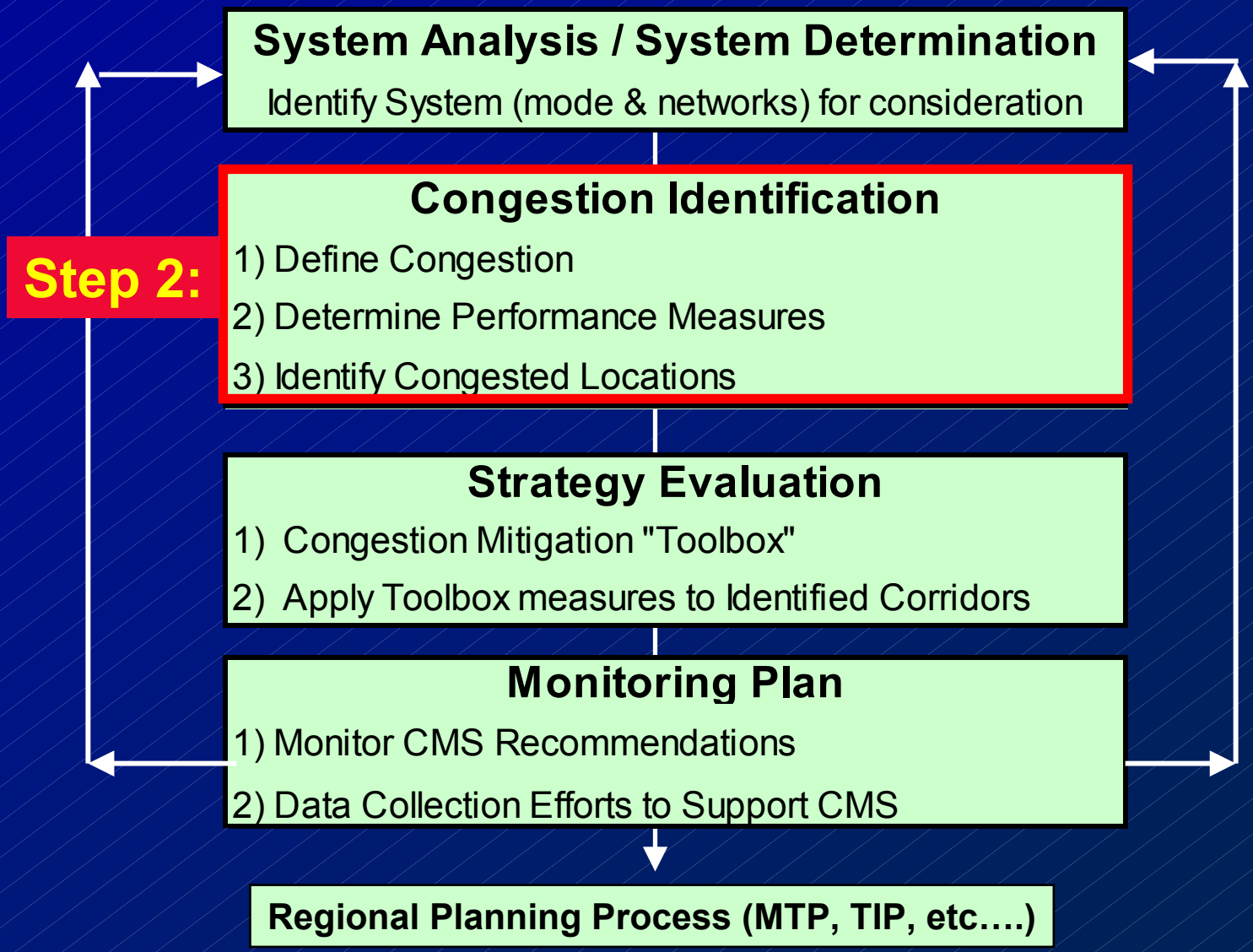


WILMAPCO 2002 CMS Road Network



Network made up of all classifications of Minor Arterial and higher;

Step 2- Congestion Identification



Step 2: Congestion Definition & Identification

Identification of congestion limited to roadway & bus congestion

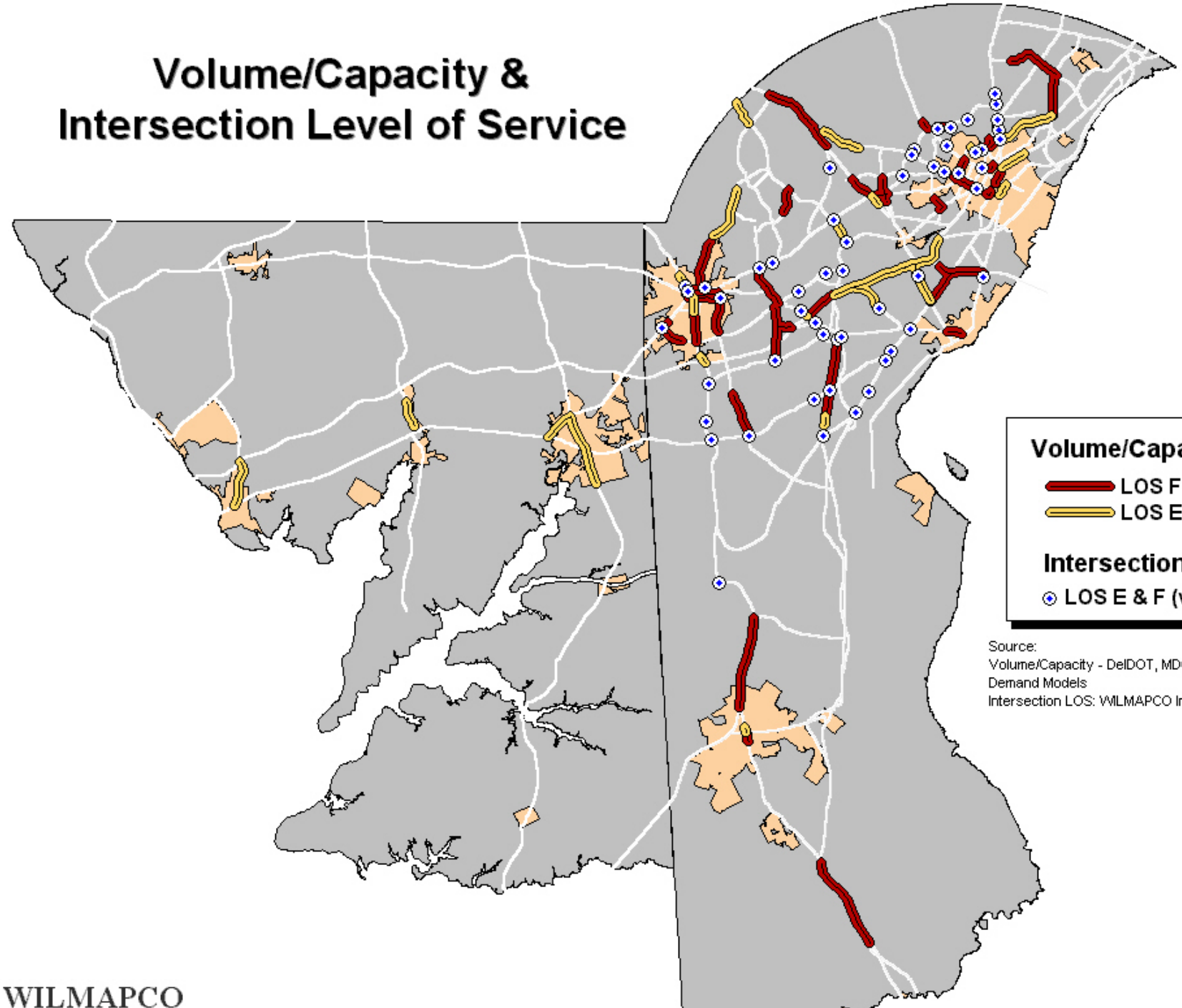
Step 2: Congestion Definition & Identification

Identification of congestion limited to roadway & bus congestion

Performance Measures

1. **Roadway Volume/Capacity Ratio**
   - Segments operating at LOS E and F
2. **Intersection Level of Service**
   - Recent data showing operation at LOS E and F
3. **Percent under posted speed**
   - Segments operating at greater than 60% BELOW posted speed
4. **Transit Level of Service (Load Factor)**
   - Routes with V/C ratio greater than 125% of capacity

Volume/Capacity & Intersection Level of Service

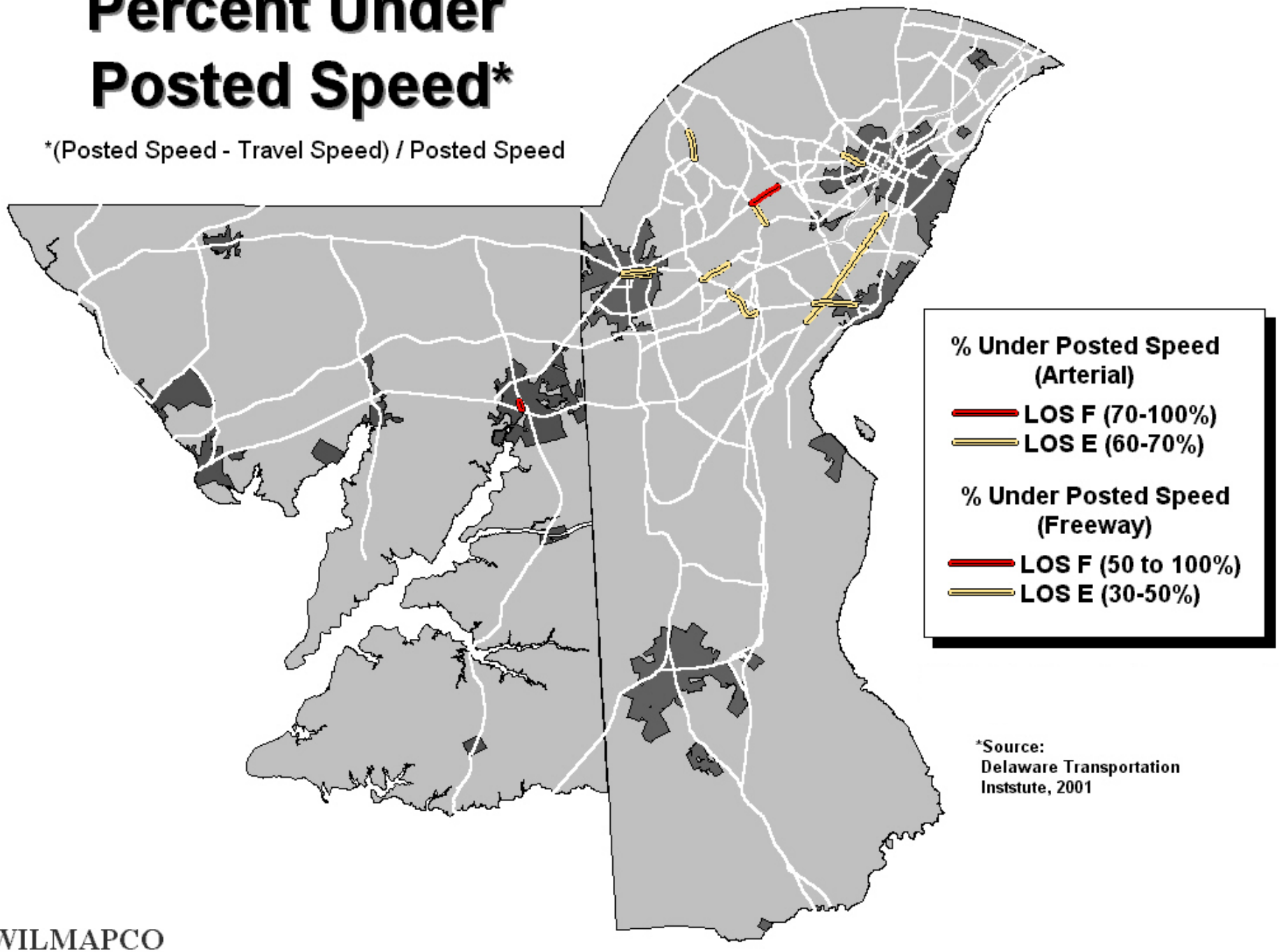


Source:
Volume/Capacity - DelDOT, MDOT Travel Demand Models
Intersection LOS: WILMAPCO Intersection Database

WILMAPCO

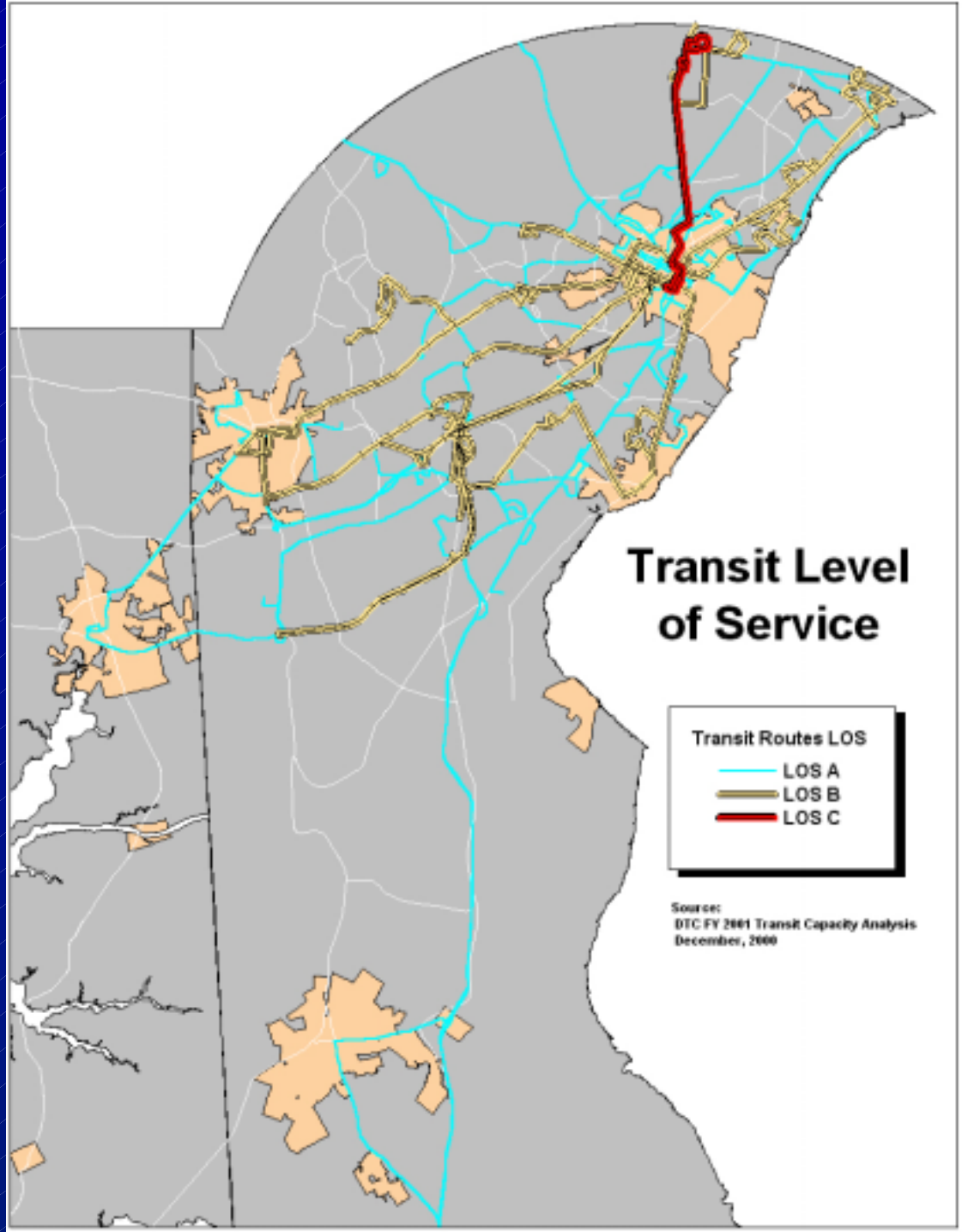
Percent Under Posted Speed*

*(Posted Speed - Travel Speed) / Posted Speed



*Source:
Delaware Transportation Inststute, 2001

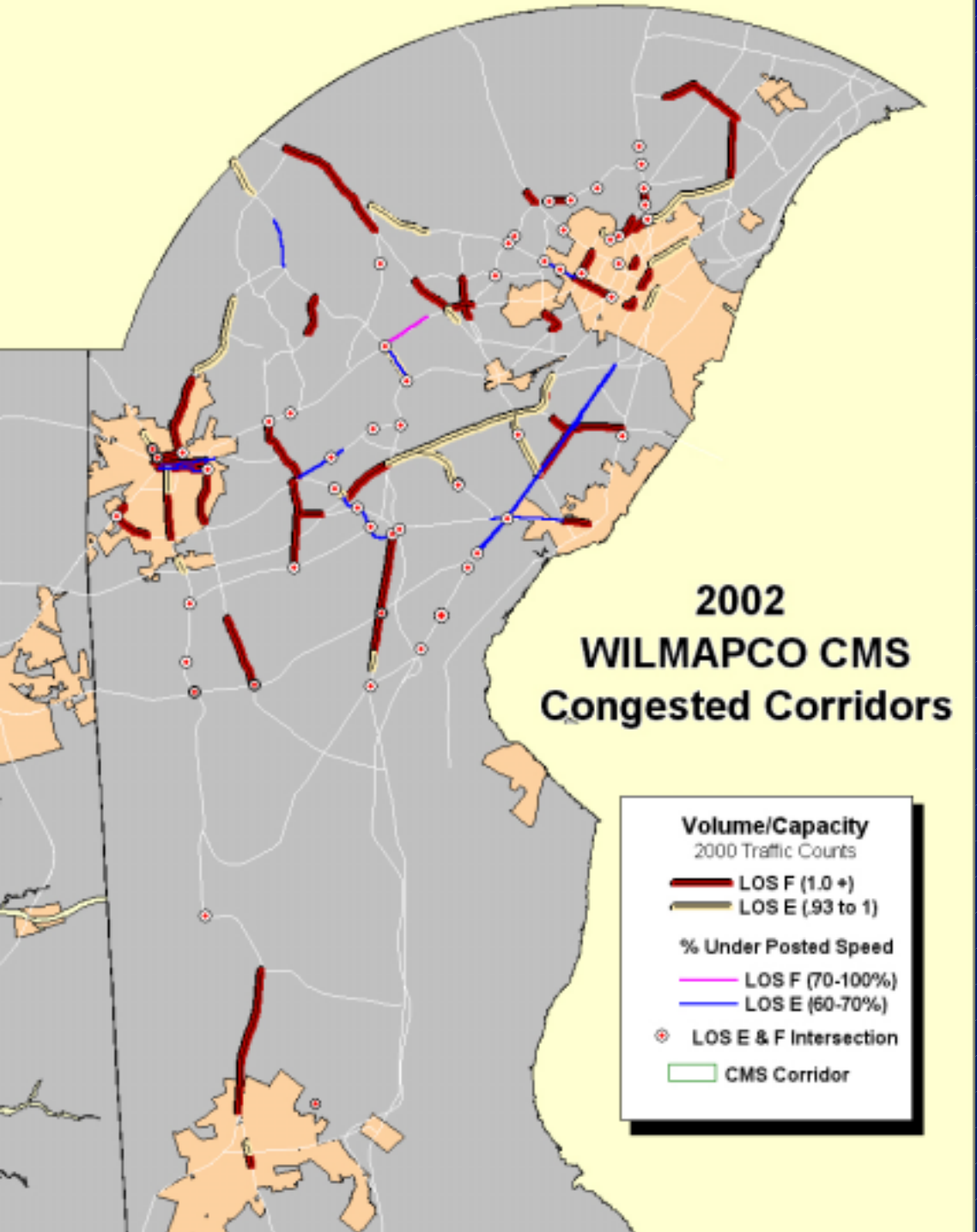
WILMAPCO

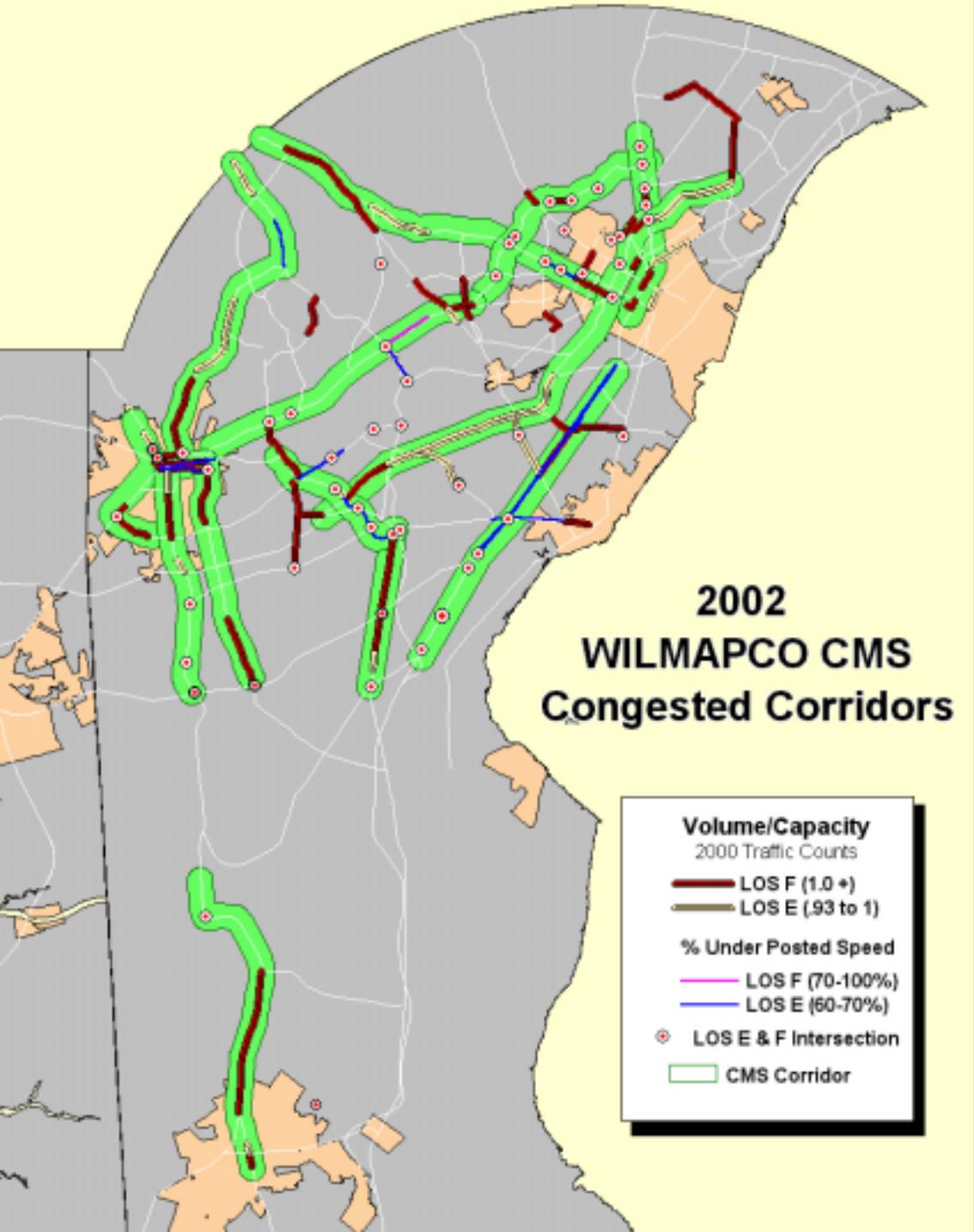


Transit Capacity Thresholds

LOS	2001 HCM V/C ratios
A	0 to .50
B	.51 to .75
C	.76 to 1.00
D	1.01 to 1.25
E	1.26 to 1.50
F	> 1.50

Corridor Definition:

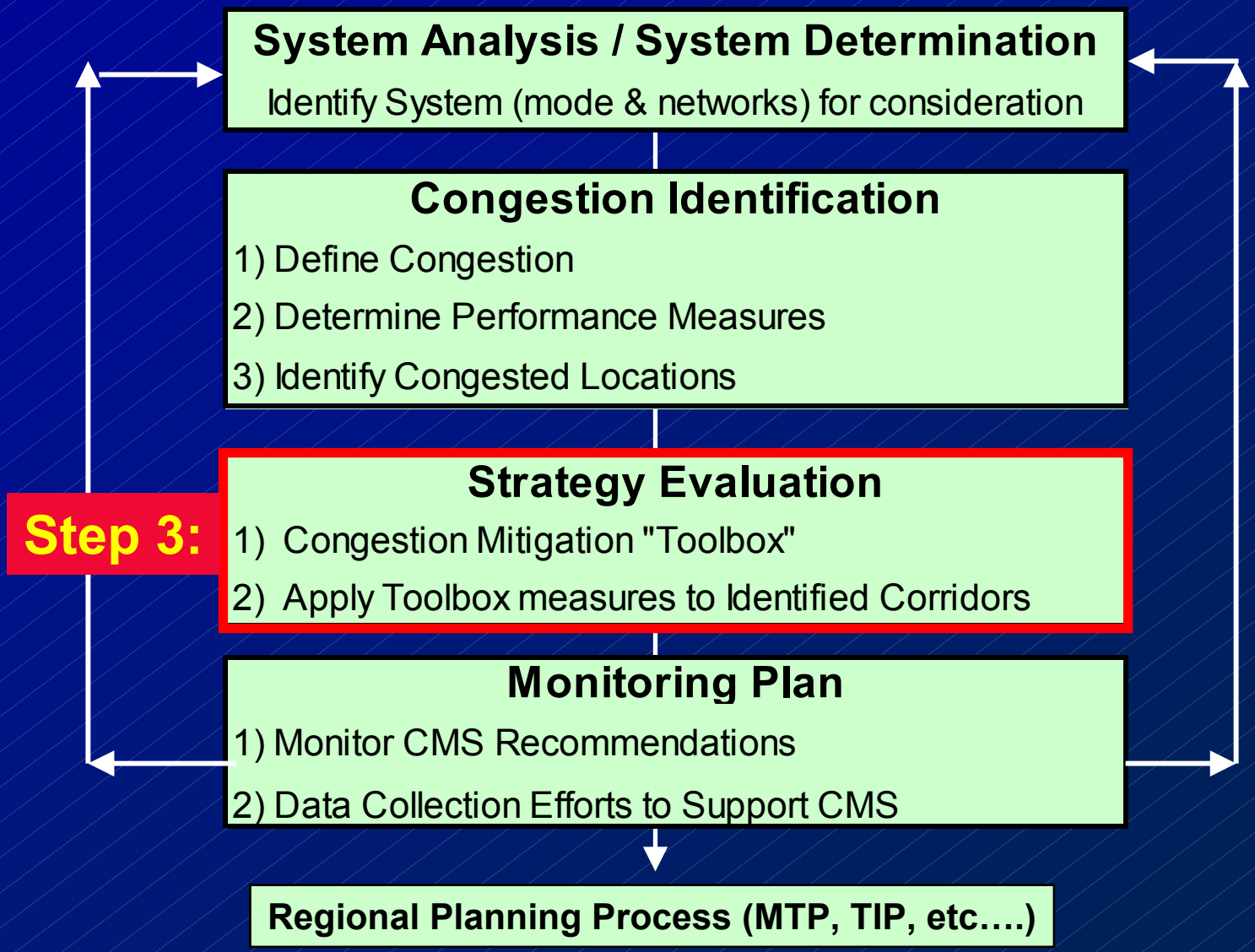




Corridor Definition:

- Group Consensus
- Capture Major Movements
- Areas with significant congestion densities (multiple measures impacting corridor)

Step 3: Strategy Evaluation



Step 3- Strategy Evaluation: The "Toolbox":

- "Top Down" approach to congestion mitigation
- Addresses alternatives to capacity addition first
- Matrix of Yes/No questions developed for each strategy
- Based on answers given, strategy determined if applicable to corridor

Step 3- Strategy Evaluation: The "Toolbox":

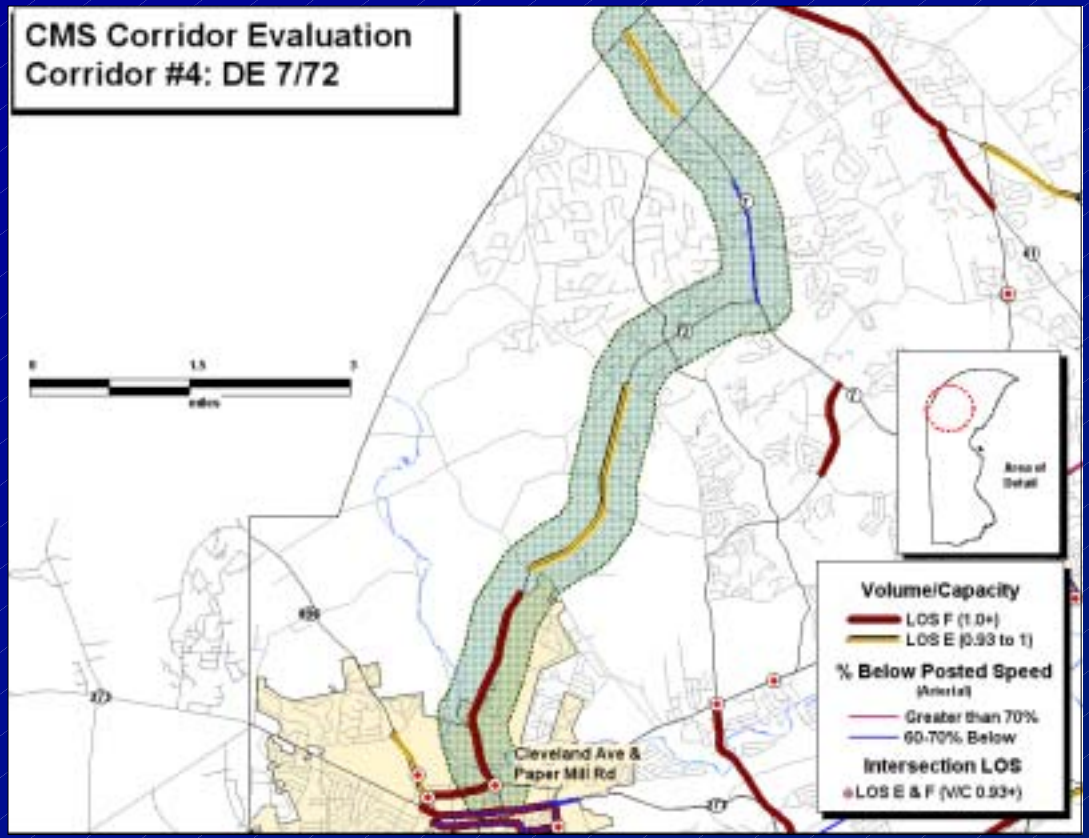
Strategy #1: Eliminate person trips or reduce VMT during peak hours
(Land Use, Congestion Pricing, TDM)

Strategy #2: Shift Trips from Automobile to Other Modes
(Transit, Bicycle and Pedestrian Improvements)

Strategy #3: Shift Trips from SOV to HOV Auto/Van
(Rideshare, HOV Facilities, Parking Management)

Strategy #4: Improve Roadway Operations
(Arterial and Freeway Operations, Access Management)

Strategy #5: Add Capacity



Corridor Data Collection

- General Corridor Characteristics
- Employment
- Population
- Transit & Travel
- Trends
- Land Use

Population	
Major Population Center - Name	Newark
Corridor Gross Dwelling Unit Count	17345
Corridor Gross Dwelling Unit Density	1.08
% of Households Along Corridor within WILMAPCO EJ Target Areas	0.0%
Trends	
Population Change 1990-2000	39.1%
% V/C Ratio Change 1998-2000	-2%
% change in avg travel speeds 1998-2001	1.88%
# of failing intersections since 1998	1

General Corridor	
Size of Corridor (Acres)	16,134
Type of Facility	Arterial
Section(s) with speed>110% of posted speed and DU density greater than 2 du/acre?	No
WILMAPCO Investment Area	Community
HSIP Corridor (2001-2002)?	Yes
Medians	No
Area with multiple driveways where Speed >/ 45 mph	Yes
Percent of Corridor with v/c > 0.9	56%

Transit	
Number of Transit Routes Serving Corridor	0
Corridor Transit Mode Share for Work Trips	1.80%
Transit Peak Period Load Factor	0
Number of Park-n-Rides Along Corridor	0
Transit Stops within corridor	3
Land Use	
% Vacant land aloing corridor	26.4%
% of residential zoned land	75.0%
% of non-residential zoned land	25.0%
% of corridor w/bike LOS B or Better	45%
Major pending developments along corridor	Yes (2)

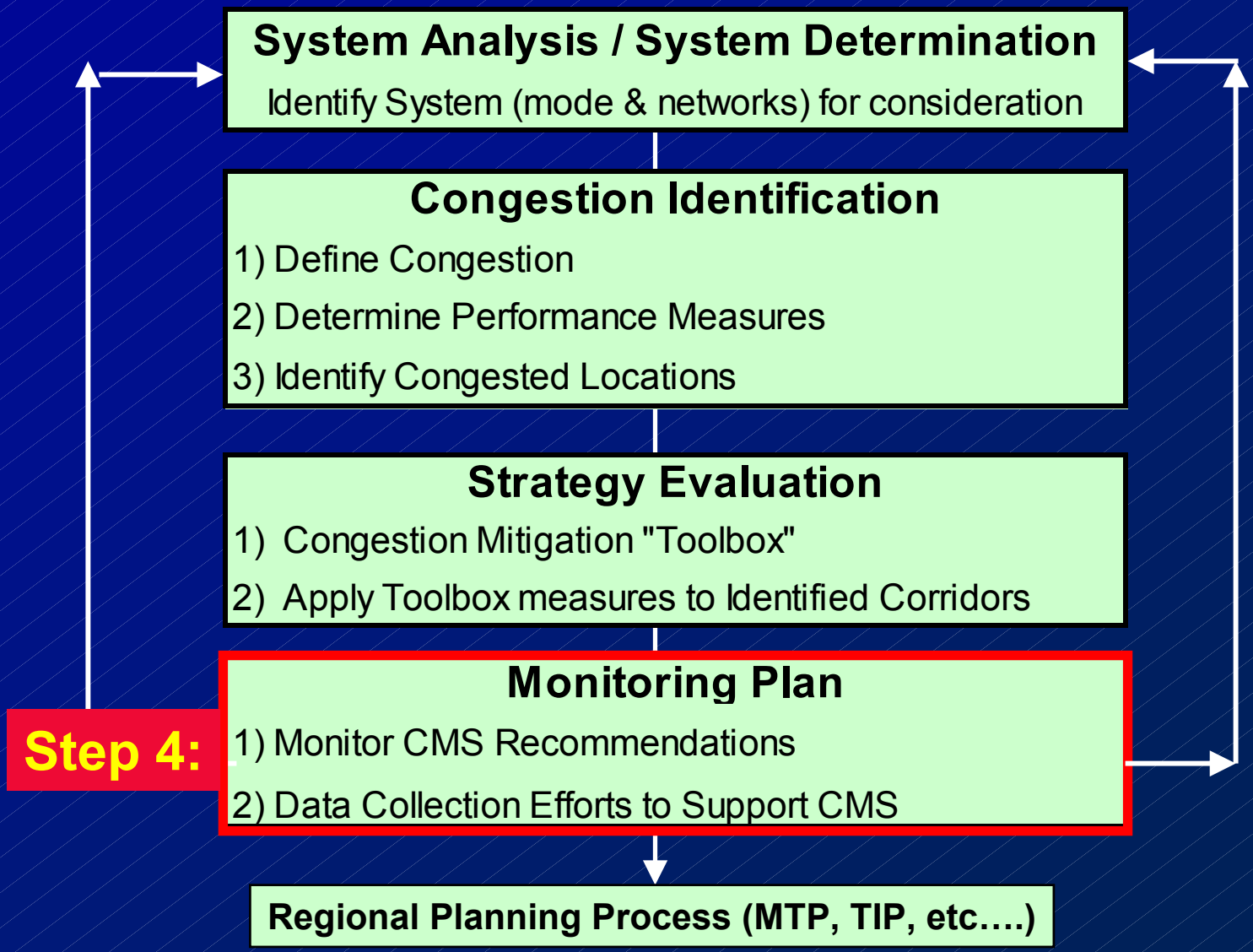
Congestion Strategy Evaluation

		Pass Screening? (See Appandix for Details)
Growth Management/Activity Centers		
1-1	Land Use Policies/Regulations	XX
Congestion Pricing		
1-2	Road User Fees	X
1-3	Parking Fees	
Transportation Demand Management		
1-4	Telecommunting	X
1-5	Encourage Employer Flextime Benefits/ Compressed Work Week	X
Public Transit Capital Improvements		
2-1	Exclusive Right of Way -- New Rail Service	
2-2	Exclusive Right of Way -- Busways, Bus Only Lanes, and Bus Bypass Ramps	
2-3	Fleet Expansion	
2-4	Improved Intermodal Connections	
2-5	Improved/Increased Park-n-Ride Facilities	
Public Transit Operational Improvements		
2-6	Service Expansion	
2-7	Traffic Signal Preemption	
2-8	Fare Reductions/Reduced Rate of Fare Increase	
2-9	Transit Information Systems	
Advanced Public Transportation Systems (APTS)		
2-10	Intelligent Bus Stops	
Bicycle and Pedestrian Modes		
2-11	Improved/Expanded Bicycle Network	X
2-12	Bicycle Storage Systems	X
2-13	Improved/Expanded Pedestrian Network	XX
Encourage High Occupancy Vehicle (HOV) Use		
3-1	Add HOV Lanes	
3-2	HOV Toll Savings	
Transportation Demand Management		
3-3	Parking Management	
3-4	Rideshare Matching Services	X
3-5	Vanpooling Programs/employee shuttle programs	XX
3-6	Employer Trip Reduction programs	X
Traffic Operational Improvements		
4-1	Intersection Geometric Improvements	x
4-2	Intersection Channelization	x
4-3	Intersection Turn Restrictions	x
4-4	Intersection Signalization Improvements	X
4-5	Coordinated Intersection Signals (ITS)	X
4-6	Traffic Calming	X

Strategy Scoring Tables

	Strategy		Criteria		Corridor 4 Applies?
Strategy #1: Eliminate Person Trips or Reduce VMT	**Growth Management/Activity Centers**				
	1-1	Land Use Policies/Regulations Encourage more efficient patterns of commercial or residential development in growth areas	1. Does this corridor have a pending major project greater than 50 DU' s or 20,000 Sq. ft.? 2. Does this corridor have more than 15% vacant land?	**1.YES** **2. YES**	**XX**
	Congestion Pricing				
	1-2	Road User Fees Includes area-wide pricing fees, time-of-day/congestion pricing and tolls	1. Is the major roadway in the corridor a limited access facility? 2. Is the peak period v/c ratio on at least 25% of the corridor greater than 0.90?	**1. NO** **2. YES**	**X**
	1-3	Parking Fees Market-based strategy designed to modify mode choice by imposing higher costs for parking private automobiles	1. Does the corridor's major employment area have at least 20,000 employees? 2. Does transit service exist in the corridor?	**1. NO** **2. NO**	
	Transportation Demand Management				
	1-4	Telecommunting	1. Does this corridor contain an employment base within a Center Investment Area? 2. Are there any employers currently allowing telecommuting as part of their TMA agreement along this corridor?	**1.YES** **2. NO**	**X**
	1-5	Encourage Employer Flextime Benefits/ Compressed Work Week	1. Does this corridor contain an employment base within a Center Investment Area? 2. Are there any employers currently allowing flextime benefits as part of their TMA agreement along this corridor?	**1.YES** **2. NO**	**X**
	Public Transit Capital Improvements				
Strategy #2: ips from Automobile to Other Modes	2-1	Exclusive Right of Way -- New Rail Service Includes heavy rail, commuter rail, and light rail services	1. Is the corridor's gross dwelling unit density at least 6 gross du/acre? 2. Does the corridor's major employment center have at least 40,000 employees? 3. Does the corridor's major employment center have a gross density of at least 30 jobs/acre	**1. NO** **2. NO** **3. NO**	
	2-2	Exclusive Right of Way -- Busways, Bus Only Lanes, and Bus Bypass Ramps	1. Does the corridor include a limited access facility? 2. Does the corridor's major employment center have a gross density of at least 30 jobs/acre 3. Is there any section of freeway in the corridor that has not reached its capacity, v/c of at least 0.75, and 15+ buses scheduled in the peak hour?	**1. NO** **2. NO** **3. N/A**	
	2-3	Fleet Expansion	1. Does transit service exist in the corridor? 2. Are there any bus routes with an avg. peak period load factor greater than 0.50? [Total Passengers / Capacity of the buses] 3. Is the corridor gross dwelling unit density greater than 3 du/acre? 4. Is the percentage of households that fall within WILMAPCO's Environmental Justice Target Areas greater than 10% of total	**1.NO** **2.N/A** **3. NO** **4. NO**	

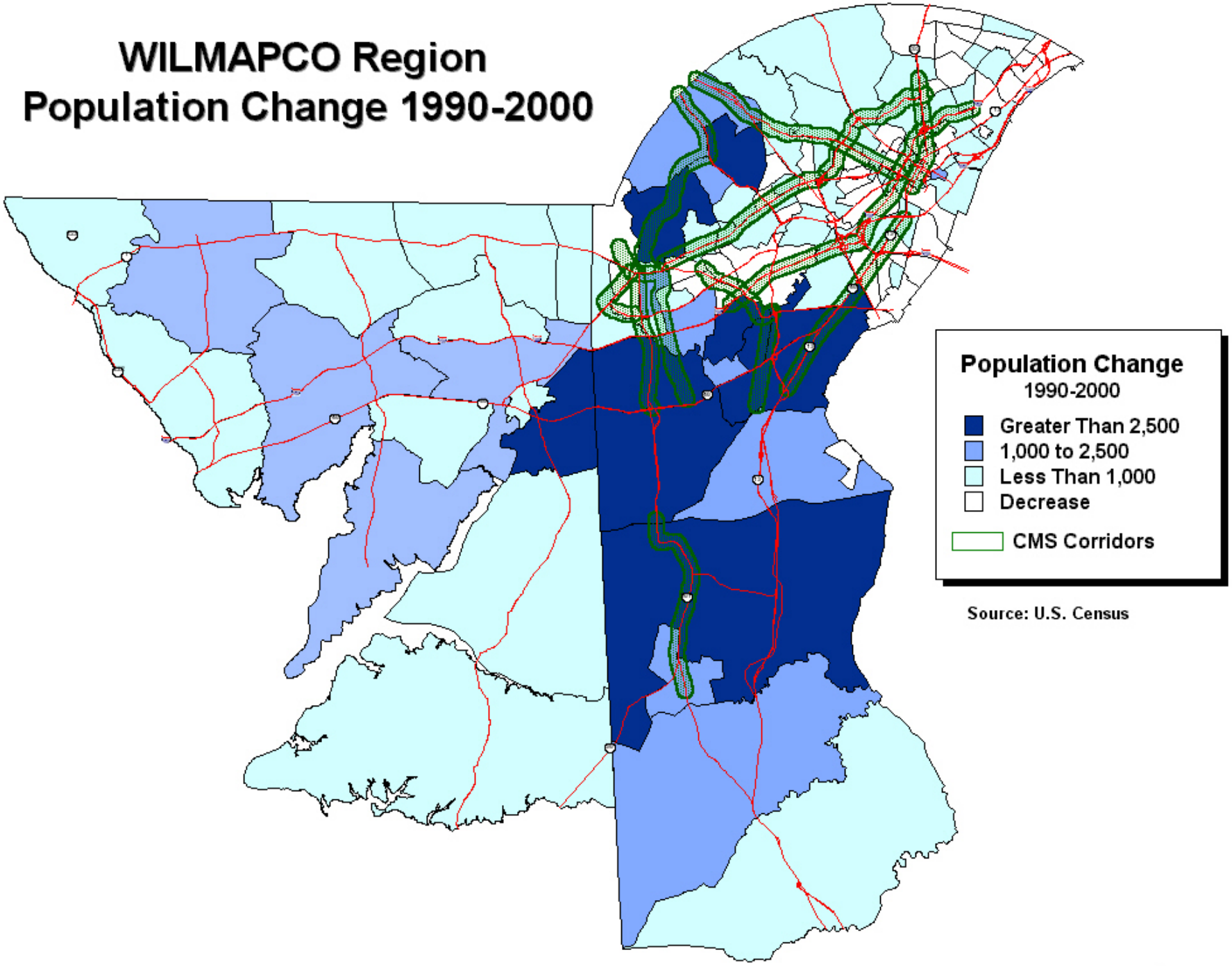
Step 4: Monitoring Plan



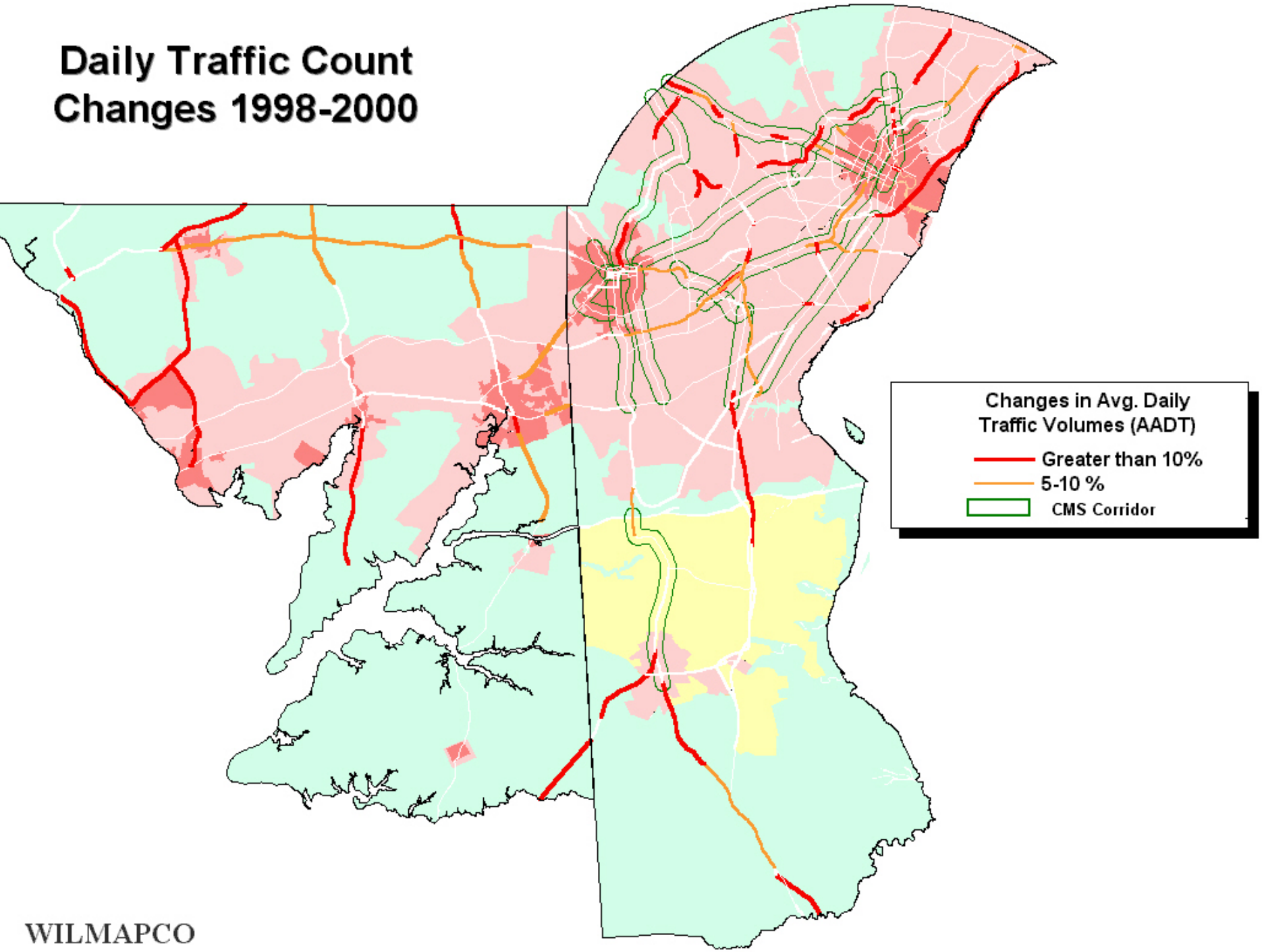
Step 4: System Monitoring

- Demographic changes 1990-2000:
- Travel Time Data changes 1998-2001:
- Traffic Volumes changes 1998-2000:
- Data Collection Activities to Support System Monitoring:
- Projects Under Study or Funded in WILMAPCO's FY2003-05 Transportation Improvement Program
- Projects listed in DelDOT Pipeline by corridor
- Status of 2001 Recommendations:

WILMAPCO Region
Population Change 1990-2000



Daily Traffic Count Changes 1998-2000



WILMAPCO

Recommendations for the 2003 WILMAPCO Congestion Management System Report

Short-Term
Continue annual public opinion survey to obtain information on congestion indicators Monitor added questions from 2001 survey to see how public perception has changed regarding congestion
Bring congestion maps out to a broader public audience after corridors have been defined and ask if map passes "reality test". Will occur as part of continuing public outreach process.
Focus Efforts on Defining Corridors – utilizing CTPPand other data sources, create logical corridors capturing major trip movements. Will occur as part of 2025 MTP Update process, beginning Fall 2002
After final CMS report approval, formally send CMS report to DOTs and request an official response on how they can incorporate the CMS into existing planning and programming processes, or suggestions for improvement. **Will occur pending final approval of the 2002 CMS report**
Begin work on developing a spatial inventory of all non-motorized facilities for the WILMAPCO region. Data will be needed to expand the screening process for each corridor.
Incorporate Environmental Justice initiatives into CMS by using defined areas of Minority and Low income populations for use in corridor analysis
Obtain On/Off Count Data from DTC on all fixed routes – Use to determine transit system congestion by route

Recommendations for the 2003 WILMAPCO Congestion Management System Report

Longer-Term
Incorporate freight **into CMS – Develop consistent freight performance measures – Develop a better understanding of the freight/auto congestion relationship.** - Review Results of Wilmington-Harrisburg Freight Study and incorporate results into CMS
Continue to examine CMS role in relation to MTP and TIP **– how do recommendations from CMS pass into MTP (policy screen) then into TIP for implementation?**
Incorporate Bicycle and Pedestrian **capacity issues into congestion identification and evaluation.**
Obtain O/D Count Data from DTC **– Use to determine transit system congestion by route**
Further Refine Congestion Mitigation Strategy Thresholds – **i.e. population density required to support transit, etc.**
More closely examine role of improved land use measures on improving congestion – **examine role of County comprehensive plans and development codes in addressing this issue.**
Locate Signal Timing History Data
Develop methods to identify and mitigate sources of non-recurring congestion (i.e accident prone areas)
Examine possibility of using “Motion Map” technology in CMS